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Community BIRD REFUGES



BIRDS appeal strongly to the interests and affections of mankind. Not only do they charm by their graceful forms, harmonious colors, sprightly actions, and usually pleasing notes, but they have an even more important claim upon our esteem because of their great economic value.

Birds feed upon practically all insect pests. They are voracious, able to move freely from place to place, and exert a steady influence in keeping down the swelling tide of insect life.

For economic as well as for esthetic reasons, therefore, an effort should be made to attract and protect birds and to increase their numbers. Where proper measures of this kind have been taken an increase of several fold in the bird population has resulted, with decreased losses from depredations of injurious insects.

This bulletin, one of a series describing the best methods of attracting birds, deals with the establishment of community bird refuges, and is adapted for use throughout the United States.

Contribution from the Bureau of Biological Survey

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COMMUNITY BIRD REFUGES.

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BIRD REFUGES ON FARMS.

FARMERS, more than any other element of the population, will be interested in the establishment and maintenance of effective bird refuges, for the welfare of crops and the commercial success of the farm are intimately related to the numbers and kinds of birds present and to their economic tendencies. In the case of certain species which are more or less injurious, control measures are sometimes necessary, but the great majority of birds vary from slightly to almost exclusively beneficial in their relations to the farm. The useful species merit the fullest protection and should be encouraged in every way.

The value of birds lies chiefly in their destruction of injurious insects. Leading an active life, they require much food, and are the most ravenous enemies of pests of this kind. The various groups of birds differ so much in habits that they feed upon practically all groups of insects; hardly an agricultural pest escapes their attacks. The alfalfa weevil has 45 different bird enemies; the army worm, 43; billbugs, 67; cotton-boll weevil, 66; brown-tail moth, 31; chestnut weevils, 64; chinch bug, 24; clover-root borers, 85; clover weevil, 25; codling moth, 36; cotton worm, 41; cutworms, 98; forest tent caterpillar, 32; gipsy moth, 46; horseflies, 49; leaf-hoppers, 120; orchard tent caterpillar, 43; potato beetle, 25; rice weevil, 21; seventeen-year locust, 38; twelve-spotted cucumber beetle, 28; white grubs, 67; and wireworms, 168.

In feeding on insect pests not only do birds take a great variety but they frequently destroy very large numbers. Often more than a hundred individuals are devoured at a meal, and in the case of small insects sometimes several thousand. With such appetites it is not surprising that occasionally birds entirely destroy certain insects locally. A number of cases are known in which trees, garden crops, and even farm fields have been entirely freed of insect pests by birds. On a 200-acre farm in North Carolina it was found that birds were destroying a million green bugs, or wheat aphids, daily.

On the average there are in the United States only about two birds to the acre, but where they are protected and encouraged it has been demonstrated that a very great increase over the normal bird population can be secured. No fewer than 59 pairs to the acre is the figure reached in the most successful of these attempts reported. At an estimated value of 10 cents each—a figure ridiculously low, but used to insure a safe minimum estimate—the birds of the United States prevent an increase in the annual damage done by insects of more than \$400,000,000.

A particular farm may not have so large a bird population as it should, and therefore may not be deriving the benefit which is its due. The most effective means of increasing the number of birds is protection, and protection in its best sense is afforded by the establishment of bird refuges.

Bird refuges on farms have been most successful when established and maintained on a cooperative plan between the landowner or landowners and a State game commission, an Audubon society, a bird club, or a school. The owner agrees to the use of the land and acts as warden, and the other party to the contract furnishes and places posters (see illustration on back page), bird houses, and feeding stations, or even stocks the refuge, as in the case of reservations for game birds. The beneficial effect which the establishment of a bird refuge has upon trespass problems is a great advantage to the farmer. A State law authorizing game wardens to proceed against trespassers on bird reservations greatly increases the effectiveness of private and cooperative bird refuges.

The cooperative bird preserve has been tried in many States as a means of establishing colonies of game birds, such as pheasants, and the plan has invariably proved popular and successful. As a method of protecting insectivorous birds it has been put into practice by schools, bird clubs, and Audubon societies in New Hampshire, Connecticut, Illinois, and Minnesota, at least, and has been found satisfactory and effective.

In creating a useful bird refuge, the first step is to insure adequate protection against all bird enemies; the second, to see that plenty of nesting sites suited to the needs of various birds are available; and the third, to improve food and water supplies, if necessary. Instructions for accomplishing these results are contained in five earlier *Farmers' Bulletins*, of which No. 609, adapted to the whole country, relates to bird houses; and the following four, to methods of attracting birds in various parts of the country: 621, Northeastern States; 760, Northwestern States; 844, Middle Atlantic States; and 912, East Central States (see map, fig. 1).

ROADSIDES.

Making bird refuges on farms, while of most direct interest to the farmer, is by no means the only activity along this line helpful to agriculture. Attracting birds to roadsides and right-of-ways, in

particular, is of almost equal importance, and furnishes a leading reason for urging a treatment of these public and semipublic travel ways that will not only increase their bird population but make them more sightly. Both features will increase the value of the adjacent farms.

There exists in most parts of the United States either a superstition, a conviction, or a legal requirement that roadsides be shorn of their vegetation at least once a year. The result is that most country roads are very uninviting in summer. Hot and gray with dust, the highway stretches away before the traveler, often without a single tree to break the monotony of the view or afford relief from the rays of the sun. This baldness is brought about chiefly by two causes: (1) Fear that the roadside will unduly increase weeds and insect and rodent pests; and (2) lack of public spirit.

Fortunately, we also have in this country examples of well-kept parkways and boulevards which border cultivated lands. Their ample parking is grown to grass and embellished with herbaceous flowering plants, shrubs, and trees. Yet the farm lands they border are neither overwhelmed by weeds nor devastated by insects and rodents.

The question of roadsides propagating vast numbers of noxious weeds may be viewed in more than one light. For instance, the mowing of waysides for long series of years has not done away with the need of cultivating adjacent crops; indeed it can not, for cultivation is necessary for other reasons than the destruction of weeds, as loosening, aeration, and water conservation. Furthermore, the amount of cultivation customarily given crops is sufficient to control all the weeds the land will grow, and this number is generally present, despite the razing of roadside growths. On the other hand, the lack of verdure and shade and the general dreariness of roadsides make the adoption of a different treatment of these most extensive public parkings very desirable. Placing vines upon fences and planting numerous shrubs and shade trees along the way will not only render the roads more attractive but will tend to keep down the dust.

In the case of paved highways it has recently been demonstrated also that roadside trees prolong the life of the pavement by protecting it from extremes of temperature. This is particularly true of the heat of summer, which, depending on the nature of the pavement, may either expand it, causing the surface to be thrown into waves, or dry it out, forming cracks.

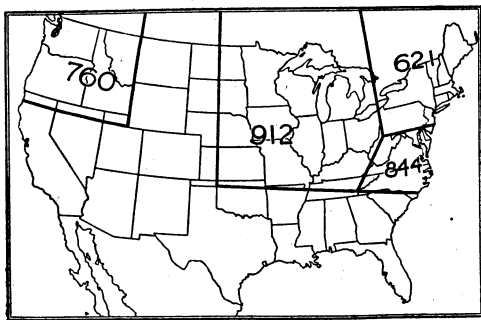


FIG. 1.—Areas treated by the several Farmers' Bulletins on methods of attracting birds.

Another practical end of planting may be served by using nut-bearing trees, which could be made a definite source of revenue to the community. In choosing plants for roadsides, as elsewhere, be sure to omit the common barberry, which serves as an alternate host for wheat rust; gooseberries and currants, which have a similar relation to the white pine blister rust; and the wild cherry, which is a favorable nursery for tent caterpillars.

There can be no doubt that suppression of roadside vegetation is a potent factor in restricting the numbers of birds, and the ever-increasing tendency to allow fence rows the minimum of space has the same effect. Farmers may gain a planting row about every field by the destruction of vegetation along fences, but they lose the services of the birds, their best allies in fighting insects.

Shrubby fence rows are among the best harbors and nesting places of small birds, and it is certain that encouraging an abundance of birds to live on farms by such plantings is a profitable policy. More should be done to beautify roadsides and fence rows, not only as a measure to contribute to the comfort and pleasure of man, but also substantially to increase a great economic asset—the bird population of the country.

In effect, windbreaks, so useful on farms in prairie regions, are but shrubby fence rows, magnified. Their utility in protecting crops from winds always is supplemented by that of furnishing nesting sites for birds, and a food-supplying function also may easily be added, since Russian olive, buffaloberry, and hackberry, all good bird foods, are highly recommended for windbreaks.

RIGHT-OF-WAYS.

A number of railroad companies have already made considerable effort to beautify their right-of-ways and station grounds. In some places the roads are paralleled for many miles by hedges, and the land on either side of the tracks is covered by beautiful turf. Hedges, shrubbery, and flower beds are common about the stations. If this planting could be directed in part, at least, toward attracting birds, it would be very effective and great good would be done. If the clumps of shrubs were formed of kinds furnishing bird food (see Table I) and more of them were placed along the right-of-ways, the hedges allowed to bear fruit, and the fence poles or possibly even some of the telegraph poles furnished with bird houses, thousands of birds could live where very few do now.

The suggestions made are by no means without practical value to the right-of-way itself. For instance, supplying bird boxes is the best method of preventing damage to poles by woodpeckers, which come anyway under present conditions and make their own homes. Hedges or fences densely covered with vines would decrease, if not entirely obviate, expenditures for the movable snow fences now extensively used.

The project of increasing the number of birds along right-of-ways should interest the agricultural development bureaus of railroads. The small birds that are most easily encouraged when shrubbery, nest boxes, and water supply are provided are chiefly beneficial, and increasing their numbers would result in great destruction of insects on adjacent farms, a very practical bit of agricultural improvement.

TABLE I.—Preference of birds among genera of fleshy fruits.¹

Common name.	Scientific name.	Number of species of birds known to eat the fruit. ²	Kinds of birds among those desirable to attract, that are most fond of the fruit. ³
Juniper; red cedar....	Juniperus.....	39	Yellow-shafted flicker, starling, evening grosbeak, pine grosbeak, purple finch, cedar waxwing, myrtle warbler, mockingbird, robin, eastern bluebird.
Greenbrier.....	Smilax.....	39	Cardinal, mockingbird, brown thrasher, catbird, hermit thrush, robin.
Bayberry.....	Myrica.....	73	Bob-white, downy woodpecker, yellow-shafted flicker, eastern phoebe, starling, meadowlark, chewink, tree swallow, white-eyed vireo, myrtle warbler, brown thrasher, catbird, Carolina wren, black-capped chickadee, hermit thrush, eastern bluebird.
Hackberry.....	Celtis.....	40	Yellow-bellied sapsucker, yellow-shafted flicker, starling, cardinal, cedar waxwing, mockingbird, brown thrasher, robin, eastern bluebird.
Mulberry.....	Morus.....	52	Yellow-billed cuckoo, red-headed woodpecker, red-bellied woodpecker, downy woodpecker, kingbird, starling, Baltimore oriole, orchard oriole, cardinal, purple finch, scarlet tanager, cedar waxwing, red-eyed vireo, yellow warbler, mockingbird, catbird, wood thrush, robin.
Pokeberry.....	Phytolacca.....	49	Mourning dove, yellow-shafted flicker, kingbird, starling, cardinal, mockingbird, catbird, hermit thrush, gray-cheeked thrush, olive-backed thrush, robin, eastern bluebird.
Spicebush.....	Benzoin.....	17	Kingbird, red-eyed vireo, wood thrush, veery.
Sassafras.....	Sassafras.....	18	Bob-white, kingbird, red-eyed vireo, catbird, veery, robin.
Strawberry.....	Fragaria.....	46	Chewink, catbird, brown thrasher, wood thrush, robin.
Raspberry; black-berry.	Rubus.....	118	Ruffed grouse, bob-white, red-headed woodpecker, yellow-shafted flicker, kingbird, starling, Baltimore oriole, orchard oriole, pine grosbeak, song sparrow, fox sparrow, white-throated sparrow, chewink, California towhee, spurred towhee, cardinal, rose-breasted grosbeak, black-headed grosbeak, cedar waxwing, red-eyed vireo, mockingbird, catbird, brown thrasher, tufted titmouse, wren-tit, olive-backed thrush, wood thrush, robin, eastern bluebird.
Rose.....	Rosa.....	25	Ruffed grouse, sharp-tailed grouse, prairie chicken, bob-white.
Mountain ash.....	Sorbus.....	14	Red-headed woodpecker, Baltimore oriole, evening grosbeak, pine grosbeak, cedar waxwing, Bohemian waxwing, catbird, brown thrasher, robin.
Chokeberry.....	Aronia.....	13	Meadowlark, brown thrasher.
Red haw.....	Crataegus.....	33	Ruffed grouse, pine grosbeak, purple finch, robin.
Dwarf apples.....	Malus.....	(4)	Ruffed grouse, ringneck pheasant, red crossbill, pine grosbeak, purple finch, cedar waxwing, mockingbird, robin.
Juneberry.....	Amelanchier....	40	Yellow-shafted flicker, Baltimore oriole, cedar waxwing, catbird, hermit thrush, veery, robin.
Wild cherry.....	Prunus.....	74	Ruffed grouse, bob-white, mourning dove, red-headed woodpecker, yellow-shafted flicker, kingbird, starling, Bullock oriole, Baltimore oriole, orchard oriole, evening grosbeak, purple finch, rose-breasted grosbeak, black-headed grosbeak, Louisiana tanager, red-eyed vireo, cedar waxwing, mockingbird, catbird, brown thrasher, olive-backed thrush, wood thrush, robin, eastern bluebird.

¹ Barberries (*Berberis*) and currants (*Ribes*) are omitted because they serve as alternate hosts of rusts attacking wheat and white pine, respectively.

² When 10 or more.

³ Included on the basis of field observation or because fruit was found in 10 or more stomachs.

⁴ Thirty-eight kinds of birds are known to feed on apples of various sorts, but it is not known just how many seek the small-fruited flowering apples, which are the best to plant for birds.

TABLE I.—*Preference of birds among genera of fleshy fruits—Continued.*

Common name.	Scientific name.	Number of species of birds known to eat the fruit.	Kinds of birds among those desirable to attract, that are most fond of the fruit.
Sumac ⁵	Rhus ⁵	93	Ruffed grouse, bob-white, valley quail, downy woodpecker, red-bellied woodpecker, red-shafted flicker, yellow-shafted flicker, phoebe, starling, goldfinch, golden-crowned sparrow, chewink, white-eyed vireo, Audubon warbler, mockingbird, catbird, California thrasher, brown thrasher, Carolina wren, black-capped chickadee, Carolina chickadee, wren-tit, hermit thrush, robin, eastern bluebird.
Pepperberry.....	Schinus.....	11	Cedar waxwing, phainopepla, hermit thrush, varied thrush, robin.
Holly.....	Ilex.....	45	Ruffed grouse, bob-white, valley quail, yellow-bellied sapsucker, yellow-shafted flicker, cedar waxwing, mockingbird, catbird, brown thrasher, hermit thrush, robin, eastern bluebird.
Supple-jack.....	Berchemia.....	13	Mockingbird, robin.
Buckthorn.....	Rhamnus.....	16	Mockingbird, catbird, brown thrasher, robin.
Wild grape.....	Vitis.....	77	Ruffed grouse, bob-white, pileated woodpecker, red-bellied woodpecker, red-shafted flicker, yellow-shafted flicker, kingbird, starling, cardinal, cedar waxwing, mockingbird, catbird, brown thrasher, wood thrush, veery, robin, western bluebird, eastern bluebird.
Virginia creeper.....	Parthenocissus..	39	Red-headed woodpecker, red-bellied woodpecker, yellow-bellied sapsucker, yellow-shafted flicker, starling, evening grosbeak, purple finch, scarlet tanager, red-eyed vireo, mockingbird, brown thrasher, tufted titmouse, hermit thrush, olive-backed thrush, gray-cheeked thrush, robin, eastern bluebird.
Buffaloberry.....	Shepherdia.....	16	Sharp-tailed grouse, pine grosbeak.
Silverberry, Russian olive, etc.	Elaeagnus.....	(⁶)	Sharp-tailed grouse, prairie chicken, cedar waxwing, catbird, robin.
Wild sarsaparilla.....	Aralia.....	14	Bob-white, robin.
Dogwood.....	Cornus.....	86	Ruffed grouse, bob-white, downy woodpecker, yellow-shafted flicker, red-shafted flicker, kingbird, starling, evening grosbeak, pine grosbeak, purple finch, white-throated sparrow, song sparrow, cardinal, cedar waxwing, warbling vireo, red-eyed vireo, catbird, brown thrasher, hermit thrush, olive-backed thrush, gray-cheeked thrush, wood thrush, robin, eastern bluebird.
Sour gum.....	Nyssa.....	36	Yellow-shafted flicker, starling, purple finch, cedar waxwing, gray-cheeked thrush, olive-backed thrush, robin.
Crowberry.....	Empetrum.....	16	Pine grosbeak, snowflake.
Bearberry.....	Arctostaphylos..	16	Ruffed grouse, dusky grouse, valley quail, mountain quail, fox sparrow, wren-tit.
Huckleberry.....	Gaylussacia.....	35	Pine grosbeak, chewink, robin.
Blueberry.....	Vaccinium.....	67	Ruffed grouse, valley quail, kingbird, orchard oriole, pine grosbeak, chewink, cedar waxwing, catbird, brown thrasher, black-capped chickadee, tufted titmouse, hermit thrush, robin, eastern bluebird.
Mexican mulberry.....	Callicarpa.....	10	Mockingbird, brown thrasher.
Partridge berry.....	Mitchella.....	10	Ruffed grouse.
Elderberry.....	Sambucus.....	106	Valley quail, red-headed woodpecker, yellow-shafted flicker, eastern kingbird, Arkansas kingbird, black phoebe, starling, California towhee, white-crowned sparrow, rose-breasted grosbeak, black-headed grosbeak, phainopepla, red-eyed vireo, mockingbird, catbird, brown thrasher, California thrasher, wren-tit, olive-backed thrush, robin, western bluebird, eastern bluebird.
Snowberry.....	Symphoricarpos.	25	Sharp-tailed grouse, evening grosbeak, pine grosbeak, varied thrush.
Black haw.....	Viburnum.....	28	Ruffed grouse, yellow-billed cuckoo, yellow-shafted flicker, starling, purple finch, rose-breasted grosbeak, cedar waxwing, catbird, brown thrasher, robin, eastern bluebird.
Honeysuckle.....	Lonicera.....	15	Bob-white, pine grosbeak, white-throated sparrow, catbird, brown thrasher, hermit thrush, robin.

⁵ Only nonpoisonous species of sumac are considered.⁶ Data given are based entirely on field observations; total number of birds eating the various species of *Elaeagnus* unknown.

COMMUNITY PARKINGS.

The attractiveness of community parkings, including those of cities and villages as well as of rural areas, may well be increased by the presence of an abundance of birds. This can be effected without in any way detracting from the utility of these reservations for their leading purposes. Making community parkings safe for birds is the first step; they must actually be havens of refuge. In this connection may be cited the admirable law of the State of Oregon, which provides that all incorporated towns and cities and all public parks and school grounds in the State shall be, without additional local or general legislation, bird and game sanctuaries.

MUNICIPAL PARKS AND PICNIC AND FAIR GROUNDS.

Picnic grounds, fair grounds, and parks may be improved as places of public gatherings, recreation, and education by increasing their



FIG. 2.—Flicker at a bird fountain.

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bird population. Moreover, the alterations that improve a park as a bird haven may, and should, themselves be made to add to its attractiveness. For instance, water is used to enhance the beauty of most parks, and a water supply is one of the most potent attractions for birds. Bird baths (fig. 2) or bird fountains may take the form of small displays of water, which may be added to many parks without being obtrusive or in conflict with the general design.

An artistic martin house, well placed in one of the small open lawns that most large parks contain (fig. 3), would not only increase the beauty and interest of the park, but would add to its dignity by suggesting a specific usefulness for the space. As for nest boxes for other birds, they may be so inconspicuously placed that the chief evidence of their presence would be the increased number of birds and the lessened injury to vegetation by insect pests. The perfection of specimen trees in parks and the work of the tree surgeon

on imperfect trees make it necessary to supply nest boxes if the hole-nesting birds are to have any chance of inhabiting parks.

Feeding stations for birds are made in a number of slightly designs, and the principles upon which they are built allow of their being extensively varied or incorporated into other park structures. The greatest usefulness of feeding stations in parks, aside from the preservation of birds, is in rendering such places more attractive to the public in winter. The feeding of birds is carried on with most obvious results during the colder months, and adding this feature to parks appeals strongly to thousands of lovers of nature.

By means of feeding stations it is possible to attract to convenient observation points several species of the most interesting and valu-



FIG. 3.—Martin house in parklike surroundings.

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able birds. Such stations are particularly pleasing to children. As evidence of the value of the method, the following statement of experience by Theodore Wirth, Superintendent of Parks, Minneapolis, Minn., is presented:

For the past five or six years we have maintained a number of feeding stations in various parts of our park system, with very satisfactory results. I give you a list of the birds which stay with us over winter. The permanent winter birds found in the vicinity of our parks are the chickadee, blue jay, white-breasted nuthatch, downy and hairy woodpeckers, and screech owl; winter visitors, the redpoll, tree sparrow, and junco; irregular winter visitors, the evening grosbeak, Bohemian waxwing, and snow bunting. It is safe to say that a large number of these species are staying in the parks on account of the food supplied them. The feeding of the wild birds in the parks is a great success and will be continued.

Supplying water, nest boxes, and winter food goes far toward making a bird haven, but it is important also to supplement the summer food. This can best be done by planting fruit-bearing shrubs and trees. Shrubs and trees are essential elements of park composition, but according to the judgment of bird lovers better choice is distinctly possible than that often made.

The guiding principle in park planning should be beauty, but it should not be a temporary or one-seasonal beauty. Hence it follows that shrubs and trees which produce colored fruits and retain them for long periods are preferable to plants whose chief decorative contribution is a short burst of bloom. Such shrubs are handsomer at all times after flowering and are particularly valuable in winter when every bit of color in the landscape is precious. They are valuable, moreover, in supplying bird food. The kinds preferred by birds are shown in Table I, and the species most suitable for various sections of the country are listed in the Farmers' Bulletins mentioned on page 5. (See also map, fig. 1.)

A few further suggestions as to the use of fruit-producing plants are not out of place. The ideal American park is natural woodland, modified and embellished, or a planting that follows natural lines. Informal treatment is almost universally preferred to formal. From the standpoint of bird attraction this is fortunate, since clipping shrubs either prevents or reduces the production of fruit and causes the plants to form such solid and dense surfaces that they are uninviting to birds. It may further be said in favor of untrimmed shrubbery that the normal form and beauty of the plants, together with the resultant play of light and motion, are preserved. With this treatment a park has naturalness and life; under formal treatment the suggestions are those of restraint and immobility.

SCHOOL AND COLLEGE GROUNDS.

Too often public-school grounds are bare and uninviting. How much better to clothe, shade, and adorn them with green. Flowers and trees will make the students more content with their surroundings, inspire them to better work, and enshrine the school grounds in pleasant memories delightful to recall in later years. Almost everything done to beautify the grounds will help to attract birds. Trees and shrubs cradle their young and supply much of their food.

The birds, the trees, and the flowers in themselves are a valuable educational resource, and are necessities for the proper conduct of classes in nature study, now deservedly so popular. Building and placing bird houses could well be part of such a course, and the winter feeding of the birds would attract living objects of interest during the dormant season of the trees and shrubs. All children like birds

and will protect and encourage them if only their early steps are guided right.

The college campus, like the park, has suffered from formal landscape gardening. Wall-like hedges, closely cropped circles, triangles of shrubs, and mathematically designed edgings, beds, and gardens have gone far toward robbing school grounds of merit in the eyes of man, and have almost spoiled them for birds.

In campus planning it is desirable to take the birds into consideration for the same reasons as in park planning. In addition there is the very important objective of keeping up an important educational resource. There is hardly an advanced school in the country that does not offer one or more courses of bird study. The study of birds out-of-doors is essential to a good bird course, and this need should be kept in view by those in charge of college and school grounds. Sylvan campuses where formerly birds abounded have been so filled with buildings, so gardened and formalized, that birds are now scarce. If possible, some corner (preferably of original woodland, where that exists) should be allowed to run wild. Judicious addition of food-producing plants should be made there, and the campus in general improved for birds by allowing shrubs to make natural growths. Putting up nest boxes would make up for the hole-eliminating activities of the tree surgeon. Winter feeding would be very interesting and instructive to many students and could be carried on as part of the course of bird-study classes. Finally, the teacher of ornithology might well have an advisory capacity in relation to the planning and treatment of the campus.

CEMETERIES.

Cemeteries have the reputation of being good places for birds. The reasons, one must infer, are seclusion, freedom from disturbance, and an abundance of trees and shrubs. The last-named factor is by no means least, nor, on the other hand, so satisfactory as not to be susceptible of improvement. Selection of shrubs and trees with the needs of birds in mind not only would not interfere with the general plan of a cemetery, but would make it a still better resort for birds.

Formal landscape gardening is more prevalent (perhaps excusably so) in cemeteries than in other public reservations, yet there are very beautiful cemeteries in which formal composition plays little part. Here, as everywhere, the informal or naturalistic planting is most favorable to birds. Nest boxes can be added without being obtrusive, and bird fountains may be made to harmonize with the surroundings or even to serve as memorials.

The movement to convert cemeteries into bird sanctuaries and to improve them for the purpose is already well under way and is being fostered by the National Association of Audubon Societies. A

pioneer in this work, H. S. Mann, Secretary of the Forest Lawn Cemetery Association of Omaha, Nebr., reports:

We have been very successful in attracting birds to Forest Lawn Cemetery. The cemetery contains 320 acres, all fenced, and is located north of the city limits of greater Omaha. It has an abundance of trees and shrubbery, about 250 acres of the half section being unimproved at this time. A creek runs through the southern portion of the cemetery, and east and north of it are great stretches of wild lands.

Bird houses, feeding stations, and baths have been erected in the cemetery. Quantities of tangled underbrush and small fruit-bearing bushes and vines have been set out and preserved for the birds. With these attractions, free from annoyance of cats, hunters, and children at play, it is a paradise for birds.

Bird students visit the cemetery frequently, as a larger number and a greater variety of birds may be found within its sacred inclosures than anywhere else in this section of the country, excepting perhaps in the great Fontenelle Forest Reserve of 2,500 acres on the Missouri River adjoining the city on the south.

RESERVOIRS.

The grounds surrounding reservoirs of drinking water usually are well fenced and carefully guarded to minimize contamination. This results in freedom from disturbance, a boon so highly appreciated by birds that in itself it goes far toward making these places satisfactory bird havens. Such reservations can be greatly improved for this purpose, however, by the use of bird houses and by proper planting, measures which will be in no way deleterious to the water supply, but which will greatly benefit the birds and through them the vegetation of the reserve and of the adjacent country.

Reservoirs other than for drinking water usually can be sown to aquatic plants, thus making them attractive to many water birds. The character of the planting will depend on circumstances; if a marshy margin is permissible, the place may be made into an excellent resort for wild fowl. If only submerged plants are desired and as clean a growth as possible, sago pondweed may be planted. Broader leaved plants furnish much greater surface for the lodgment of silt and the growth of algae. The methods of propagating a variety of aquatic plants for the use of wild fowl are described in publications of the Department of Agriculture.¹

GOLF COURSES.

There are numerous public golf courses, and many of those established by clubs are so surrounded by residences of members as to become virtually community institutions. Golfers as a class are broadly interested in the out of doors, including its animal inhabitants, and most of them no doubt will be glad to cooperate in the preservation, encouragement, and increase of useful birds. In fact, considering the well-known utility of birds in destroying insect and other pests, golf clubs will only be consulting their own interests in preserving and propagating these natural enemies of the foes of their greens and fairways.

¹ Bull. 205, U. S. Dept. Agr., Eleven Important Wild-Duck Foods; Bull. 465, Propagation of Wild-Duck Foods.

Golf courses, without special modification, present several features that are attractive to birds. The broad expanses of short grass on the fairways furnish excellent feeding grounds for robins, meadow-larks, starlings, flickers, and killdeers. The longer grasses and weeds of the rough, and scattered clumps of trees and shrubbery open to full light, support an abundant insect population, an important source of food for our feathered friends. Many birds find nesting sites also in the arborescent growths present and sally forth for food over the grassed areas, where they are often joined by numbers of those aerial feeders, the swallows and swifts, which find on these unobstructed reaches happy hunting grounds.

Such are the impressions recalled of a season's observations on a golf course well situated for birds. There are courses not so fortunate, but all have the fundamentals of valuable bird refuges. Protected to a considerable extent from trespass, and relatively free from the natural enemies of birds, golf courses already have much of the safety required for sanctuaries. Birds promptly respond to protection; but it should be as complete as possible. So far as food is concerned, insects are plentiful on most golf courses, but it would help the birds and ornament the courses if shrubbery on the grounds were selected chiefly from species producing fruits fed upon by birds. Most golf courses, again, have water hazards at which birds can drink and bathe; but where these are absent or are far apart, bird fountains could easily be attached to hydrant supply pipes. These not only would be a boon to birds on hot summer days, but if placed in view of rest benches would be a source of interest and entertainment to members and visitors.

Protection, food, water—these are the things that usually are present in some degree and which may very easily be supplemented; but nesting sites, especially for some of the most useful birds, are scarce or lacking on most golf courses. Trees and shrubbery (the latter best if in tangled masses) will accommodate many birds; but the birds that nest in cavities can hardly find a home on improved lands, especially where tree-surgeons have been employed. Fortunately these birds will occupy artificial cavities or nest boxes.

In most cases nest boxes must be supplied if we would enliven and benefit our golf courses with such beautiful and useful birds as the purple martin, bluebird, house wren, tree swallow, flicker, white-breasted nuthatch, and chickadee. At least twice as many other kinds of small birds have been known to occupy nest boxes. Placing nest boxes is work which can well be done in winter, a season during which, at least on northern courses, employees are but little occupied, and when members may welcome something to do out of doors. Names of dealers in bird boxes, bird baths, and the like, and bulletins treating all phases of bird attraction methods, as well as advice in special cases, may be obtained by application to the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

**PUBLICATIONS OF THE U. S. DEPARTMENT OF AGRICULTURE
RELATING TO THE PROTECTION AND ATTRACTION OF WILD
BIRDS.**

AVAILABLE FOR FREE DISTRIBUTION BY THE DEPARTMENT.

Eleven Important Wild-Duck Foods. (Department Bulletin 205.)
Propagation of Wild-Duck Foods. (Department Bulletin 465.)
Game as a National Resource. (Department Bulletin 1049.)
Bird Houses and How to Build Them. (Farmers' Bulletin 609.)
How to Attract Birds in Northeastern United States. (Farmers' Bulletin 621.)
How to Attract Birds in Northwestern United States. (Farmers' Bulletin 760.)
How to Attract Birds in the Middle Atlantic States. (Farmers' Bulletin 844.)
How to Attract Birds in the East Central States. (Pennsylvania to 100th
meridian.) (Farmers' Bulletin 912.)
Game Laws. (Annual publication, that for 1921, Farmers' Bulletin 1235.)
Community Bird Refuges. (Farmers' Bulletin 1239.)
Directory of Officials and Organizations Concerned with the Protection of Birds
and Game. (Annual publication, that for 1921, Department Circular 196.)
Our Shorebirds and Their Future. (Separate 642, Yearbook 1914.)
The Great Plains Waterfowl Breeding Grounds and Their Protection. (Sepa-
rate 723, Yearbook 1917.)
Federal Protection of Migratory Birds. (Separate 785, Yearbook 1918.)
Conserving Our Wild Animals and Birds. (Separate 836, Yearbook 1920.)

**FOR SALE BY THE SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING
OFFICE, WASHINGTON, D. C.**

Preliminary Census of Birds of the United States. (Department Bulletin 187.)
Price, 5 cents.
Second Annual Report of Bird Counts in the United States, with Discussion of
Results. (Department Bulletin 396.) Price, 5 cents.
Plants Useful to Attract Birds and Protect Fruit. (Separate 504, Yearbook
1909.) Price, 5 cents.
Bird Day in the Schools. (Biological Survey Circular 17.) Price, 5 cents.
National Reservations for the Protection of Wild Life. (Biological Survey Cir-
cular 87.) Price, 5 cents.
Chronology and Index of the More Important Events in American Game Protec-
tion, 1776-1911. (Biological Survey Bulletin 41.) Price, 10 cents.
Decision of the Supreme Court of the United States Sustaining the Constitu-
tionality of the Migratory-Bird Treaty Act. (Department Circular 102.)
Price, 5 cents.

A black and white photograph of a dense forest. The trees are tall and their leaves are thick, creating a canopy that filters the light. In the lower left corner, there is a rectangular sign with text. The sign is slightly tilted and appears to be attached to a tree or a post. The background is filled with the intricate patterns of tree branches and foliage, with some light breaking through the canopy in the upper right.

NO SHOOTING

BIRD RESERVATION
MAINTAINED BY
THE OWNERS AND
THE STATE NORMAL SCHOOL